

DOTD TESTING PROCEDURES GUIDELINES FOR STANDARD FORMAT

INTRODUCTION

Louisiana Department of Transportation and Development (DOTD) testing procedures establish department testing standards which ensure consistency and accuracy in the department's quality assurance program. These procedures are used by the department, contractors and consultants when testing materials related to DOTD construction and maintenance activities.

All DOTD testing procedures are published in the DOTD Testing Procedures Manual and must follow a standard format. This format guideline is designed to formalize this standard format.

The Testing Procedures Committee (hereafter referred to as the committee), is responsible for establishing standards for the department's quality assurance program and is charged with the responsibility of evaluating and approving all DOTD test procedures. Proposed new test procedures or revised existing test procedures are to be submitted to the DOTD Materials Engineer Administrator for committee processing. In order for the committee to effectively evaluate a proposal for a new or revised test procedure, it is necessary for the proposal to be structured in accordance with the standard format. This format guideline is also designed to be of assistance to the submitter in the organization of a test procedure proposal. Test procedures establish department testing standards and function as job aids. Therefore, each procedure must be written in such a manner that a technician can perform the test with minimum assistance by following the procedure. For simplicity and consistency, test procedures are to be written in the command form, present tense. All abbreviations shall be standard abbreviations and, if not commonly recognized, shall be completely spelled the first time use (e.g., specific gravity = s. g.). Abbreviations such as F (Fahrenheit) shall not be spelled out.

Although all test procedures will not utilize all of the section headings shown in this format guideline, all submittals must include the sections listed as required. Other sections are occasionally used to aid the technician. These are listed as optional.

The committee reserves the right to incorporate other sections or to modify the standard format when needed.

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Designation - The DOTD designation, assigned by the committee consists of a sequential number in the applicable section of the Testing Procedures Manual. If a designation has not been assigned by the committee, use "DOTD TR XXX."

Year of Issue - After the designation, a hyphen is followed by the last two digits of the year of the adoption or of last revision.

Title - The title must be concise, but complete enough to identify the nature of the test, the material to which it is applicable, and to distinguish it from similar titles. If the procedure covers more than one test, each test shall be formatted separately and identified under the title by Method A, Method B, Method C, etc., with appropriate, short subtitle.

- I. **Scope (Required)**
 - A. Include information relating to the purpose, application and limitations of the test procedure. State the range of application of the procedure as completely as possible. If the procedure covers more than one test, include a scope for each method.
 - B. Any reference to alternative, companion, or related test procedures may be included.
- II. **Terminology (Optional)**

Definitions and descriptions of terms specific to the test procedure appear under this heading.
- III. **Apparatus (Required)**
 - A. Include a brief description of the essential features of all equipment, tools, chemicals, etc., required for the test. Schematic drawings or photographs shall be included as figures and referenced. (See XII.)
 - B. Avoid the use of trademarks, unless a specific manufacturer's product is required. In such cases, a note may be included giving supplementary information regarding such apparatus or material. The note should state that this apparatus or material or its equivalent "has been found satisfactory for this purpose." When special types of glassware are required, such as heat resistant, chemical resistant, etc., state the significant characteristic desired rather than a trademark. For example, use "heat resistant glass" rather than "Pyrex or Kimak." Specify filter paper by describing the significant characteristic such as porosity, rate of filtering, ash content, etc.
 - C. List reagents alphabetically. Give the name of the reagent first, followed by any descriptive term. State the desired concentration, if significant; then, follow with instructions for preparation and standardization (if required). Spell out the full

name of the reagent, and immediately after the first mention of the name, include within parentheses the exact chemical formula. Exceptions to this rule may be made in the case of organic, organometallic, or complex inorganic compounds by omitting the chemical formula. Subsequent references to compounds shall be by formula only where they can be clearly specified, as in the case of most inorganic compounds. As exceptions, always spell out the word "water" and the name of substances in their elementary state; for example, use lead, not Pb; oxygen not O₂. If the reagent is to be used as purchased, and not diluted, dissolved, or purified, state the chemical formula as given by the manufacturer. Examples of reagent descriptions are:

1. Ammonium Carbonate
 $((\text{NH}_4)_2\text{CO}_3)$
2. 1,1,1, Trichloroethane,
Technical grade
3. Barium Chloride Solution
(100 g/L) - Dissolve
100g of barium chloride
(BaCl₂·2H₂O) in water
and dilute to one liter.

IV. Health Precautions (Optional)

Whenever a health hazard exists, a statement warning of the hazard and detailing the precautions to be taken to prevent injury shall be included.

V. Samples, Test Specimens, Test Locations, etc. (Optional)

- A. A sample is the quantity of

material submitted to represent the product. If necessary, include the size of the sample, precision required, and any conditioning, preparation or protective measures that are required prior to testing.

- B. If the entire sample is not to be tested, the representative portion that will be tested is to be referred to as a test specimen. Include any special procedures to be used to obtain the test specimen from the sample; detailed requirements as to the size and number of test specimens, and any preparation, conditioning or protective measures required. Where a test specimen of a particular shape is required, the essential dimensions shall be specified, including tolerances. A drawing showing the details of the specimen may be included as a figure and referenced. (See XII.)
- C. There will be times when samples and test specimens will not be applicable to the test procedure, (e.g., roadway density and roadway surface tolerance, etc.). For these situations reference should be made to DOTD specifications and/or the Materials Sampling Manual. Include if necessary any restrictions or limitations that apply to the test location such as "instrument must be a certain distance from a vertical surface when in use," etc. Also include special instructions or details concerning the test location or situation that would aid the technician in using the procedure properly.

VI. Calibration and Standardization (Optional)

- A. Apparatus - Give detailed instructions for calibration and adjustment of the apparatus, if necessary.
- B. Reference Standards - Give detailed instructions for the standardization and use of reference standards. Describe any standards used to assure uniformity of the test technique, standard specimens or photographic standards.
- C. Calibration Curves and Tables - Give detailed instructions for the preparation and use of calibration solutions, reference standards, blanks, color development, photometry, construction, etc.

and Rounding Rules specified in this manual. A complete example must be included when it is necessary to clarify reported values to show proper application of the Calculation and Rounding Rules; when there is a deviation from the Calculation and Rounding Rules; or when the calculations are complex. Example of a typical equation:

1. Calculate the moisture content (I) to the nearest 0.1% using the following formula:

$$I = \frac{H}{G} \times 100$$

VII. Procedure (Required)

Include in proper sequence step-by-step directions for performing the test, grouping related operations into logical divisions. Make the text of the procedure concise, to the point and easily understandable. This section must be written in such a manner that a technician can run the basic procedure with minimum assistance using the test procedure as an aid.

where:

H = mass of water removed from the sample, g
 G = dry mass of sample, g
 100 = constant

example:

$$H = 23$$

$$G = 5446$$

$$I = \frac{23}{5446} \times 100$$

$$= .00422 \times 100$$

$$= 0.422$$

$$I = 0.4\%$$

VIII. Calculation and Interpretation of Results (Required)

- A. Calculation - Give directions for calculating the results of the test, including any formulas. Spell out names in the text, but use symbols in the formulas to designate individual values. Use numerical values for any constants. Define symbols immediately under the equation. Indicate the reference point on which the calculations are based, such as on the sample as received, dry basis, etc., and the units in which the results are reported. All calculations, unless otherwise specified, shall conform to the DOTD Calculation

- B. Interpretation of Results - Use this heading in place of "Calculation" when the results of the test must be expressed in

descriptive form, relative terms, abstract values. List and define the descriptive terms or classifications used. The results of a test may also be interpreted or expressed in terms of a rating scale. If a rating scale is used, define the scale and its use.

IX. Report (Required)

State detailed information required in reporting the results of the test, including method used. A standard report form or worksheet will be used and a properly completed example included in the test procedure as a figure and referenced. (See XII.) The example used in the body of the text shall match the example on the worksheet or standard form. Complete examples of all documentation are to be attached to the test procedure.

X. Normal Test Reporting Time (Required)

Include the time needed to prepare the sample, perform the test, and report results.

XI. Notes (Optional)

- A. Notes shall not be a numbered section, but shall appear as close as possible to the material which they explain.
- B. Notes in the text shall not include mandatory requirements. Notes

are intended to set explanatory material apart from the text itself, when such information does not fit within the standard format.

- C. Notes in a given procedure shall be numbered in sequence. Notes shall preferably appear at the end of the paragraph to which they pertain or at the end of the subdivision. If it is desired to refer to a note in connection with a specific word or phrase in the text, that word or phrase would be followed by a reference to the note (Note 1), etc.

XII. Illustrations and Tables, etc. (Optional)

- A. Illustrations and tables etc., shall not be a numbered section. They shall appear at the most appropriate point within the procedure, shall be referenced in the text and shall be labeled.
- B. Illustrations, tables, work reports, etc., shall be designated as figures with arabic numerals. Line drawings are preferable to photographs. Furnish text titles or captions for each figure. Each table shall stand on its own with each table entry clearly identified.